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Proximity effect for asymmetrical three-layered F/S structures in external magnetic field

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Abstract

We study the critical temperature T c of the three-layered ferromagnet/superconductor (F/S) structures in the external magnetic field H parallel to the film. For the F1/S/F2 and F1/F2/S asymmetrical trilayers, the triplet superconducting component is generated at noncollinear magnetizations of the F layers. Assuming that all S and F layers are dirty, we solve boundary problem for the Usadel function. The results of numerical calculations for T c as function thicknesses both F1 and F2 layers at various parameters F/S structure are presented. The application to the spin-switch problem is discussed. We found that asymmetry can essentially change the spin-switch observation condition. The re-entrant superconductivity caused by external magnetic field is predicted for the F1/F2/S trilayer.

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Keywords

Critical temperature, Proximity effect, Spin switch, Superconductivity